

Application No. 10/798,175
Amendment dated November 11, 2005
Reply to Office Action of August 15, 2005

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Cancelled).

2. (Cancelled).

3. (Currently Amended) A series of die set sets used in a method for manufacturing a hollow rack shaft, said method comprising; series comprising: a first [[step]] die set for forming a substantially flat and rectangular plate workpiece into a gutter-like shaped workpiece, said gutter-like shaped workpiece having a flat bottom portion, a pair of semi-circular bottom portions extending from each longitudinal side of said flat bottom portion, and a pair of leg-like side walls extending upwardly in parallel from each lateral side of said flat bottom portion and said semi-circular portions; bottom portions, said first die set having a pair of dies with a pressing surface inclined in a longitudinal direction of said gutter-like shaped workpiece relative to a pressing surface of a second pair of dies so as to cancel elastic recovering of said gutter-like shaped workpiece when said gutter-like shaped workpiece is removed from a second die set; and

[[a]] said second [[step]] die set for forming a row of rack teeth on said flat bottom portion of said gutter-shaped gutter-like shaped workpiece, said second die set providing a complementary surface to said semi-circular bottom portions; and

a third step for forming said workpiece into a hollow shape by bending said leg-like side walls by butting edges of said walls to each other;

wherein a die set used in said second step provides a complementary surface to said semi-circular bottom portion and a pressing surface of a pair of dies is inclined in a longitudinal direction of said workpiece relative to a pressing surface of a second pair of

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~~dies used in said first step die set so as to cancel elastic recovering of said workpiece when said workpiece is removed from said second die set.~~

4. (Currently Amended) A series of die set sets used in a method for manufacturing a hollow rack shaft, said ~~method comprising;~~ series comprising:
 - a first [[step]] die set for forming a substantially flat and rectangular plate workpiece into a gutter-like shaped workpiece, said gutter-like shaped workpiece having a flat bottom portion, a pair of semi-circular bottom portions extending from each longitudinal side of said flat bottom portion, and a pair of leg-like side walls extending upwardly in parallel from each lateral side of said flat bottom portion and said semi-circular bottom portions; and
 - a second [[step]] die set for forming a row of rack teeth on said flat bottom portion of said gutter-shaped gutter-like shaped workpiece, said second die set providing a complementary surface to said row of rack teeth formed on said flat bottom portion and said second die set including a first pair of dies and a second pair of dies having a difference in pressing angle suitable to cancel longitudinal elastic recovering of said gutter-like shaped workpiece when said gutter-like shaped workpiece is removed from said second die set.; and
 - ~~a third step for forming said workpiece into a hollow shape by bending said leg-like side walls by butting edges of said walls to each other;~~
~~wherein a die set used in said second step provides a complementary surface to a row of rack teeth formed on said flat bottom portion and said die set includes a first pair of dies and a second pair of dies having a difference in pressing angle suitable to cancel longitudinal elastic recovering of said workpiece when said workpiece is removed from said die set.~~

5.-14. (Cancelled).

15. (New) A method for manufacturing a hollow rack shaft, said method comprising:

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a first step for forming a substantially flat and rectangular plate workpiece into a gutter-like shaped workpiece, said gutter-like shaped workpiece having a flat bottom portion, a pair of semi-circular bottom portions extending from each longitudinal side of said flat bottom portion, and a pair of leg-like side walls extending upwardly in parallel from each lateral side of said flat bottom portion and said semi-circular bottom portions;

a second step for forming a row of rack teeth on said flat bottom portion of said gutter-like shaped workpiece; and

a third step for forming said gutter-like shaped workpiece into a hollow shape by bending said leg-like side walls by butting edges of said leg-like side walls to each other;

wherein a die set used in said second step provides a complementary surface to said semi-circular bottom portions and a pressing surface of a pair of dies is inclined in a longitudinal direction of said gutter-like shaped workpiece relative to a pressing surface of a second pair of dies used in said first step so as to cancel elastic recovering of said gutter-like shaped workpiece when said gutter-like shaped workpiece is removed from said die set.

16. (New) A method for manufacturing a hollow rack shaft, said method comprising:

a first step for forming a substantially flat and rectangular plate workpiece into a gutter-like shaped workpiece, said gutter-like shaped workpiece having a flat bottom portion, a pair of semi-circular bottom portions extending from each longitudinal side of said flat bottom portion, and a pair of leg-like side walls extending upwardly in parallel from each lateral side of said flat bottom portion and said semi-circular portions;

a second step for forming a row of rack teeth on said flat bottom portion of said gutter-like shaped workpiece; and

a third step for forming said gutter-like shaped workpiece into a hollow shape by bending said leg-like side walls by butting edges of said leg-like side walls to each other;

wherein a die set used in said second step provides a complementary surface to a row of rack teeth formed on said flat bottom portion and said die set includes a first pair of dies and a second pair of dies having a difference in pressing angle suitable to cancel

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longitudinal elastic recovering of said gutter-like shaped workpiece when said gutter-like shaped workpiece is removed from said die set.

17. (New) The series of die sets according to claim 3, wherein said gutter-like shaped workpiece is formed into a hollow shape by bending said leg-like side walls by butting edges of said leg-like side walls to each other.

18. (New) The series of die sets according to claim 4, wherein said gutter-like shaped workpiece is formed into a hollow shape by bending said leg-like side walls by butting edges of said leg-like side walls to each other.